

SWBAT: compare series and parallel circuits

Jan 4-7:20 AM

# Welcome!!!

H. Leslie Grebe

- \* Pick up:
- yellow concept sheet
- slip of paper (for later)

SECA Physics  
Tuesday 8 March 2016



Opening Questions:

FORMULA

R  
I  
V

What are the units for resistance?  $\Omega$

for current? A

for voltage? V

UNITS/MEASURE

Centering

Sep 7-7:04 AM



## Mystery Resistor - extra credit

- You may work alone or with at most one other person of your choosing.
- Get a "Mystery Resistor" labeled with a letter from Leslie
- Use the same equipment that our teams used in class. Take measurements that will allow you to calculate the resistance (in Ohms) of your resistor.
- You may work when there is spare time in class or arrange other time with Leslie.

Due by 3:00 Friday 3/18

Jan 19-7:12 AM

### Catchy Physics Phrases:

- Series circuits have one path.
- Parallel circuits have more than one path.



Mar 21-7:21 AM

## A visit to "Circuitopia"

People: **ELECTRONS**

Moving / speed of people: **CURRENT**

"Gotta catch my flight!": **VOLTAGE**

12.3 sec

Passport checker: **RESISTOR**

16.6 sec

Speed? **SLOWER!**

Plane → passport checker → visa checker → plane **SERIES**

Speed? **SLOWER**

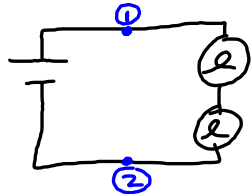
Break! **STOPPED!**

2 Passport checkers: **PARALLEL**

Speed? **FASTER THAN SERIES, FASTER THAN ONE SLOWER THAN NONE!**

Mar 5-8:35 AM

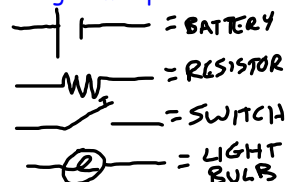
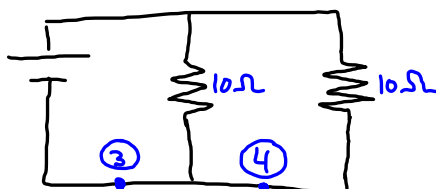
Circuit Puzzles: Predict, explain, observe



WILL THE CURRENT BE THE SAME AT ① & ②?

Observation: 0.45 A on both spots

Explanation: One path, one wire, all electrons flowing same speed



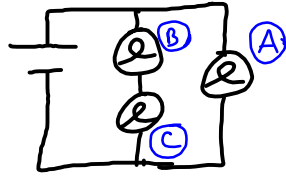
WILL THE CURRENT BE THE SAME AT ③ & ④?

Observation: 1.80 A at (3) and 0.90 A at (4)

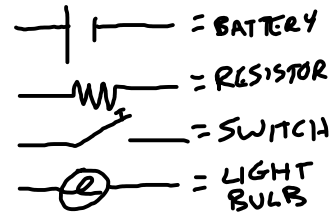
Explanation: All moving electrons need to use the wires closest to the battery. But the electrons don't need to go through both resistors! So some through each path.

Mar 23-7:45 AM

Circuit Puzzles: Predict, explain, observe



ALL BULBS  
ARE IDENTICAL



1) HOW WILL THE BRIGHTNESSES OF THE 3 BULBS COMPARE? ( $A=B=C$ ?  $A>B>C$ ? ...)

Observation:  $A > B = C$

Explanation: Electrons going down far path have only one resistor.

Same push from the battery gets twice the brightness when there's half the resistance.  
B & C are in series so they have to have the same current (and brightness).

2) IF I UNSCREWED (B) (OR IT BURNED OUT), WHAT WOULD HAPPEN TO (A) & (C)?

Observation: A stayed the same. C went out.

Explanation: Thinking of Circuitopia airport, if one line had a passport checker AND visa checker, that line would just stop if one went on break.

The other line that only required one check would just keep doing what it was doing, no matter how many other lines are open.

Mar 23-7:45 AM

Concept sheet: 6 rows total

Concept	Meaning	Symbol	Units	Analogy
CHARGE	PROPERTY OF PROTONS & ELECTRONS THAT CAUSES ATTRACTION & REPULSION	$q$	COULOMBS $C$	
VOLTAGE = ELECTRIC POTENTIAL	POTENTIAL BASED ON POSITION IN AN ELECTRIC FIELD "PUSH"	$V$	VOLTS $V$ $V = \frac{J}{C}$	- PERSON PEDALING ⇒ THE PUSH
CURRENT	THE FLOW OF ELECTRIC CHARGE $= \frac{CHARGE}{TIME}$	$I$ $I = \frac{q}{t}$	AMPERE $A$ $1A = \frac{1C}{s}$	- WHEEL CHAINS MOVING
RESISTANCE	OPPOSITION OF CURRENT "AGAINST THE FLOW"	$R$	OHMS $\Omega$	BRAKES
OHM'S LAW	VOLTAGE = CURRENT TIMES RESISTANCE	$V = I \cdot R$	$V$ $= I \cdot \Omega$	HOW HARD DO YOU PEDAL? BRAKE AFFECTS SPEED BIKE!



Feb 23-7:34 AM

### Daily 3 Questions

- \* Every day except test/project days
- \* 3 Questions on the topics of the day
- \* Main source of daily points
- \* I am happy to give credit when I have no concerns about someone giving or getting help with the answers.

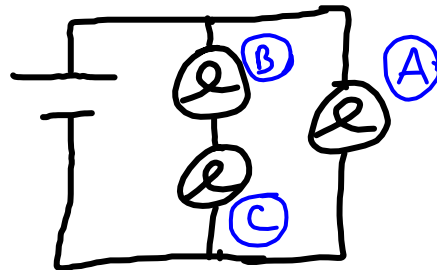
You can't get your points if you don't have your **NAME!!!**

Name	Period
1.	
2.	
3.	

Sep 9-7:32 AM

1. Which bulb will be brightest?

- A.
- B.
- C.
- All the same.



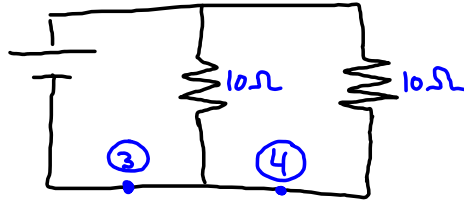
2. What happens to a series circuit when the passport checker goes on break?

3. Is the flow through the circuit (or airport) better when the resistors are in series or in parallel? (Which is faster?)

Feb 18-6:59 AM

1. How does current compare at 3 & 4?

- A. bigger at 3
- B. bigger at 4
- C.  $3 = 4$



2. What happens to a series circuit when the passport checker goes on break?

STOPS!

3. Is the flow through the circuit (or airport) better when the resistors are in series or in parallel? (Which is faster?)

$$\begin{aligned}
 & \text{60W} = 0.06 \text{ kW} \\
 & 120\text{V} \\
 & 8\text{¢/kWh} \\
 & \text{kW} \cdot \text{hr} \cdot 8\text{¢} \\
 & \text{hr} = 24 \times 7 \times 30
 \end{aligned}$$

Feb 18-6:59 AM